The Utility of MRI in Cervical Spine Clearance in Alert Blunt Trauma Patients with Cervical Spine Tenderness and Negative CT Scan

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STUDY OBJECTIVE

- **To evaluate the utility of MRI of the cervical spine in alert blunt trauma patients with a GCS of 15 without any neurological deficits who have cervical spine tenderness and a negative CT scan.**

HYPOTHESIS

- **Blunt trauma patients with a GCS 15 who have cervical spine tenderness do not need an MRI when the CT scan of the cervical spine is negative.**

METHODS

- **A retrospective study was performed from January 2005 through August 2012 at a community-based Level II trauma center.**
- **Of the 1,400 blunt trauma patients who underwent a CT and an MRI of the cervical spine, 601 patients met the inclusion criteria.**
- **This included patients who had a negative CT of the cervical spine, GCS 15, with persistent cervical spine tenderness and without any neurological deficits.**
- **All MRI results were reviewed and those of clinical significance (requiring long term immobilization or operative intervention) were independently reviewed by each of the three neurosurgeons at our institution.**

DATA

Table 1. Cervical Injuries Identified with MRI in Patients with Negative CT Scans and Their Ultimate Treatment

PATIENT	MRI FINDING	TREATMENT
Patient 1	anterior ligamentous disruption	cervical collar
Patient 2	bulging annulus	cervical collar
Patient 3	anterior ligament edema	Miami –J collar
Patient 4	prevertebral edema	Philadelphia collar
Patient 5	non-displaced C2 fracture	Aspen Collar
Patient 6	compression fracture/ligament strain	Miami-J collar
Patient 7	cord contusion	Anterior cervical fusion

Image 1.
C2 Fracture Identified on MRI of Patient 5

Figure 1. Flow diagram containing patients who underwent both CT and MRI of the cervical spine.

Table 2. Mean Injury Severity Scores in Patients Based on CT and MRI findings

Imaging	Injury Severity Score (ISS)
Overall ISS mean	6.7
Negative CT and MRI	6.0
Negative CT, Positive MRI	8.9
Clinically Significant MRI	15.7

Table 3. Mean Age of Patients by Findings on CT and MRI

Imaging	Mean Age
Overall Mean Age	43.7
Negative CT and MRI	41.6
Negative CT, Positive MRI	49.8
Clinically Significant MRI	55.6

RESULTS

- **Of the 601 patients who met the inclusion criteria, 155 (25.8%) had an abnormal MRI of the cervical spine.**
- **Seven (1.2%) patients had clinically significant findings, with only one (0.2%) undergoing operative management.**
- **The remaining six (1.0%) individuals were managed with long- term cervical spine immobilization.**

CONCLUSION

Blunt trauma patients who are awake and alert without any neurological deficits, who have cervical spine tenderness despite a negative CT, may not warrant an MRI prior to cervical spine clearance.